Amendments to the Claims

The following Listing of Claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A method of forming a ferroelectric PZT film on a substrate, comprising:

metering from a ~~liquid~~ source reagent ampoule a selected quantity of a premixed liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium;

vaporizing the metered source reagent solution to form a precursor vapor; and

introducing the precursor vapor into a chemical vapor deposition chamber containing the substrate.

Claim 2 (original): The method of claim 1, wherein the zirconium precursor comprises $Zr(OiPr)_2(thd)_2$ or $Zr(thd)_4$ or $Zr(OtBu)_2(thd)_2$.

Claim 3 (original): The method of claim 1, wherein the lead precursor is $Pb(thd)_2(pmdeta)$, the zirconium precursor is $Zr(OiPr)_2(thd)_2$, and the titanium precursor is $Ti(OiPr)_2(thd)_2$.

Claim 4 (original): The method of claim 1, wherein the lead precursor, the titanium precursor and the zirconium precursor have a combined concentration between about 0.05 M and about 1.0 M in solution.

Claim 5 (original): The method of claim 1, wherein the source reagent solution is characterized by lead, zirconium and titanium concentrations between about 5% and 95%.

Claim 6 (original): The method of claim 1, further comprising introducing into the chemical vapor deposition chamber an oxidizing co-reactant gas comprising 5-100% N_2O.

Claim 7 (original): The method of claim 6, wherein the oxidizing co-reactant gas comprises 50-75% N_2O.

Claim 8 (original): The method of claim 1, further comprising introducing into the chemical vapor deposition chamber an oxidizing co-reactant gas comprising one or more of the following gases: N_2O, O_2, and O_3.

Claim 9 (currently amended): A method of forming a ferroelectric PZT film on a substrate ~~The method of claim 1~~, ~~further~~ comprising:

providing a first premixed source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium;

providing a second premixed source reagent solution comprising a second mixture of the lead precursor, the titanium precursor and the zirconium precursor in the solvent medium, wherein the first source reagent mixture is different from the second source reagent mixture;

mixing the first and second reagent solutions to form a precursor solution;

vaporizing the precursor solution to form a precursor vapor; and

introducing the precursor vapor into a chemical vapor deposition chamber containing the substrate.

Claim 10 (original): The method of claim 9, wherein the first and second source reagent solutions are characterized by a lead concentration in a range of about 28-65%, a zirconium concentration in a range of about 14-29%, and a titanium concentration in a range of about 20-43%.

Claim 11 (original): The method of claim 1, wherein the solvent medium comprises an octane-based solvent.

Claim 12 (original): The method of claim 1, wherein the source reagent solution is vaporized at a temperature in the range of about 180-210°C.

Claim 13 (original): The method of claim 1, further comprising maintaining the chemical vapor deposition chamber at a pressure in the range of about 0.5-10 torr during deposition.

Claim 14 (original): The method of claim 13, wherein the chemical vapor deposition chamber is maintained at a pressure in the range of about 0.5-4 torr during deposition.

Claim 15 (original): The method of claim 14, wherein the chemical vapor deposition chamber is maintained at a pressure of approximately 4 torr during deposition.

Claim 16 (original): The method of claim 1, wherein the source reagent solution is selected to obtain a precursor vapor having a Zr/(Zr + Ti) ratio in the range of about 0.05-0.70.

Claim 17 (original): The method of claim 1, wherein the source reagent solution is selected to obtain a precursor vapor having a Pb/(Zr + Ti) ratio in the range of about 0.3-3.0.

Claim 18 (original): The method of claim 1, further comprising preheating the substrate during a preheating period.

Claim 19 (original): The method of claim 18, wherein the preheating period is about 5-30 seconds long.

Claim 20 (original): The method of claim 18, further comprising disposing the preheated substrate on a heated susceptor during a heating period prior to formation of the PZT film on the substrate.

Claim 21 (original): The method of claim 20, wherein the heating period is about 30-60 seconds long or longer.

Claim 22 (original): The method of claim 1, further comprising providing a flow of a purge gas to reduce film depositions on susceptor and chamber wall surfaces.

Claim 23 (currently amended): A method of forming a ferroelectric PZT film on a substrate, comprising:

introducing a substrate into a chemical vapor deposition chamber;

preheating the substrate during a preheating period;

after the preheating period, disposing the substrate on a heated susceptor during a heating period;

metering from a ~~liquid~~ source reagent ampoule a selected quantity of a premixed liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium;

vaporizing the metered source reagent solution to form a precursor vapor; and

introducing the precursor vapor into the chemical vapor deposition chamber to form a ferroelectric PZT film on the heated substrate.

Claim 24 (original): The method of claim 23, wherein the substrate is preheated by supporting the substrate above the heated susceptor during the preheating period.

Claim 25 (original): The method of claim 23, further comprising providing a flow of a purge gas to reduce film depositions on susceptor and chamber wall surfaces.

Claim 26 (currently amended): A method of forming a ferroelectric PZT film on a substrate, comprising:

introducing a substrate into a chemical vapor deposition chamber;

preheating the substrate during a preheating period;

after the preheating period, disposing the substrate on a heated susceptor during a heating period;

metering from a first liquid source a selected quantity of a first premixed liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium;

~~The method of claim 23, further comprising~~ metering from a second liquid source a selected quantity of a second premixed liquid source reagent solution comprising a second mixture of the lead precursor, the titanium precursor and the zirconium precursor in the

solvent medium, wherein the first source reagent mixture is different from the second source reagent mixture;

vaporizing the metered first and second source reagent solutions to form a precursor vapor; and

introducing the precursor vapor into the chemical vapor deposition chamber to form a ferroelectric PZT film on the heated substrate.

Claim 27 (original): The method of claim 26, further comprising mixing the first and second premixed liquid source reagent solutions to form a precursor mixture and, subsequently, vaporizing the precursor mixture to form the precursor vapor.

Claim 28 (original): The method of claim 26, wherein the first and second source reagent solutions are characterized by a lead concentration in a range of about 28-65%, a zirconium concentration in a range of about 14-29%, and a titanium concentration in a range of about 20-43%.